IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the application of

JOHN B. LETTS,
WAYNE E. LAUGHLIN, and
BRUCE M. MILLER

Serial No. 10/632,343

Filed August 1, 2003

For INSULATION BOARDS AND METHODS FOR THEIR MANUFACTURE

Group Art Unit 1711

John Cooney, Examiner

Certificate of Mailing

I hereby certify that this correspondence was deposited with the United States Postal Service as first class mail in an envelope addressed to:
Commissioner for Patents, P.O. Box 1450, Alexandria VA 22313-1450 on March 15, 2007

Kimberly A. Bright, Secy. to Arthur M. Reginelli

TRANSMITTAL SHEET

Enclosed are the following documents:

Appeal Brief
Appendix A
Return Receipt Postcard

AUTHORIZATION TO CHARGE DEPOSIT ACCOUNT

The Commissioner is hereby authorized to charge payment of any fees associated with this communication or credit any overpayment to Deposit Account No. 06-0925.

Respectfully submitted,

Arthur M. Reginelli, Reg. No. 40,139
Tama L. Drenski, Reg. No. 50,323
Renner, Kenner, Greive, Bobak, Taylor & Weber
Fourth Floor, First National Tower
Akron, Ohio 44308-1456
Telephone: (330) 376-1242
Attorney for Applicants

March 15, 2007

P02030US2A(P336)

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APPEAL BRIEF PURSUANT TO 37 C.F.R. 1.192

BOX AF
COMMISSIONER FOR PATENTS
P.O. BOX 1450
ALEXANDRIA, VA 22313-1450

Dear Sir:

This is an appeal to the Board of Patent Appeals from the rejections in the Office Action mailed May 25, 2006. The Notice of Appeal was mailed on August 25, 2006. An Appeal Brief was mailed December 22, 2006. A Notification of Non-Compliant Appeal Brief was mailed to Appellant on February 23, 2007 and the present Appeal Brief corrects the issues raised in the Notification.

I. REAL PARTY IN INTEREST

The owner of the present patent application is Bridgestone Firestone Diversified Products LLC.

II. RELATED APPEALS AND INTERFERENCES

Appellant and Appellant legal representatives, or Assignee, are not aware of any related Appeals or Interferences that would directly affect or be directly affected by, or have a bearing on the Boards decision in the present pending Appeal.[1]

[1] Appellant notes, however, that U.S. Serial Nos. 10/468,487 and 10/640,895 are likewise on Appeal, and while these Appeals are not believed to affect or have a bearing on the Board's decision in the present Appeal, the applications do relate to similar technology and were examined in the same art unit as the subject application.

III. STATUS OF CLAIMS

Claims 1 and 30-40 are pending and stand rejected under 35 U.S.C. § 103. Claims 34-38 are the subject of this appeal. Claims 2-29 and 41 are cancelled.[2]

[2] Appellants attempted to cancel claims 1, 30-33 and 39-40 after filing the Notice of Appeal in order to narrow the issues on appeal. The Appellant further attempted to amend claim 34 to correct an antecedent basis issue that was uncovered by Appellant during preparation of this Brief. Neither amendment was entered by the Examiner. The Appellant only presents arguments related to claims 34-38 in this Brief.

IV. STATUS OF AMENDMENTS

An amendment was filed November 22nd, cancelling claim 41. This amendment was entered by the Examiner. A further supplemental amendment was filed on November 27th, cancelling claims 1, 30-33, and 39-40 in order to narrow issues on Appeal. In the latter amendment, claim 34 was amended to place the rejected claim in better form for consideration for appeal by providing proper antecedent basis for all claim elements. The amendment of November 27th was not entered by the Examiner.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

The claimed subject matter, as set forth in independent claim 34, relates to a method for producing polyisocyanurate foams. As set forth in claim 34, these foams may be produced by providing an A-side stream of reactants including an isocyanate. (Pg. 4, Ln. 19-20). A B-side steam of reactants is provided including an isocyanate reactive component and a blowing agent selected from the group consisting of alkanes, (cyclo)alkanes, hydrofluorocarbons, hydrochlorofluorocarbons, fluorocarbons, fluorinated ethers, alkenes, alkynes and noble gasses. (Pg. 5, Ln. 16-19). Nitrogen is added to the A or B side stream where the amount added is an amount sufficient to increase the volume of developing foam as it instantaneously leaves the mix head by at least 1.25. (Pg. 10, Ln. 5-8).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 34-38 stand rejected under 35 U.S.C. § 112 as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention.

Claims 34-38 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 3,882,052 to Raynor et al. in view of U.S. Patent No. 5,278,195 to Volkert et al. Claims 34-38 further stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,264,464 to Wishneski et al. in view of U.S. Patent No. 5,278,195 to Volkert et al.

VII. ARGUMENT

a. Rejections under 35 U.S.C. § 112

The Examiner has rejected claims 34-38 under 35 U.S.C. § 112, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention. Specifically, the Examiner asserts that the claims are confusing because the basis and conditions for determining the Bunsen coefficient values of the claims are not recited in the claims.

While the Applicant disagrees with this an assertion relating to claims 1 and 39, independent claim 34 does not include any limitations relating to Bunsen Coefficient values. It is therefore believed that the rejection of claims 34-38 under 35 U.S.C. § 112 is in error.

b. Rejections under 35 U.S.C. § 103

Claims 34-38

The Examiner has rejected claims 34-38 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 3,882,052 to Raynor et al. in view of U.S. Patent No. 5,278,195 to Volkert et al. According to the Examiner, Raynor discloses preparations of isocyanate-based rigid foams prepared by contacting streams of isocyanate component and polyol component wherein the contacting takes place in the presence of blowing agent and nitrogen gas to enhance the foaming action. The Examiner acknowledges that Raynor differs from the claimed invention with respect to formation of polyurethane foams. This shortcoming is compensated by reliance on Volkert, which allegedly discloses that control of the amounts of reactive materials dictates formation of isocyanurate foam products rather than polyurethane products. Also, the Examiner believes that Volkert provides motivation for achieving increased flame retardancy as a reason to desire a modulation in reactant amounts. Accordingly, the Examiner believes that it would have been obvious to have modified the NCO indices in a manner taught by Volkert within practice of Raynor for the purpose of increasing flame retardancy.

Applicants describe frothing as the instantaneous increase of volume of developing foam as it exits the mix head. (Pg. 9, Ln. 24). This definition is consistent with the prior art

– such as Raynor '052 – which describes frothing as a pre-expansion of a foaming mixture upon expulsion from a static mixer (col. 5, lines 55-60). Claim 34 not only recites an instantaneous increase in the volume of developing foam as it leaves the mix head, but Claim 34 quantifies this increase by reciting an increase of at least 1.25.

Both Raynor '052 and Wishneski '464 employ nitrogen as a "nucleating agent" in the production of polyurethane foams. The Examiner focuses on Raynor's teaching at Column 4, lines 15-33 which, without careful consideration, seems to suggest broad latitude in the amount of nucleating agent (e.g. nitrogen) that can be used:

> The nucleating gas may be used in any suitable proportion that is effective in bringing about thorough blending of the foam forming ingredients such as to produce an acceptable foam which is substantially uniform and free of weak spots. Thus this proportion can be varied over a wide range, limited only by practical considerations such as the capacity of the foam forming mixture to dissolve or hold the gas within it under the desired operational gas pressure and the nature of the particular foaming system that is used. Nevertheless, ordinarily a minimum of about 0.003% by weight of the gas, based on the total weight of the foam forming ingredients, is necessary to achieve the requisite nucleating effect. In actual practice a proportion of the gas in excess of 0.005 percent, such as from about 0.006 to about 0.08 percent by weight is used, although of course higher as well as lower concentration may suitably be employed.

While this paragraph includes words like "any suitable proportion" and "of course higher as well as lower concentrations may suitable be employed," these words must be read in context and with an understanding of Raynor's intent and teachings as a whole. Namely, Raynor's primary concern is to avoid frothing! Indeed, Raynor discusses the problems associated with frothing at Column 1, lines 28-64:

> It is generally known that thorough mixing and blending of the foam forming ingredients, to the degree necessary for generating a uniform and acceptable foam which is free of weak spots, cannot ordinarily be achieved by the single expedient of using a static mixer. This is due in part to the relatively high viscosity of the foam forming reactants. Conventionally, therefore, resort is had to the added expedient of incorporating in the foam forming reaction mixture an auxiliary fluorocarbon blowing agent such as Freon 12. This material, when injected under pressure into the foam forming mixture, serves to augment the function of the static mixer in bringing about intimate and thorough blending of the foam forming ingredients.
>
> By virtue of the inclusion of this auxiliary blowing agent in the foam forming

> mixture, the blended components of the system, on being expelled from the foaming apparatus, characteristically have a limited-flow consistency similar to that of aerosol shaving cream. This is attributed to the fact that the auxiliary blowing agent causes partial pre-expansion or "frothing" of the mixture by the time this is expelled from the foaming apparatus. Thus the foam has come to be referred to in this particular art as a "frothed foam."
>
> The phenomenon of foam frothing, while it may be desirable in certain applications, has at least two disadvantages. One is that frothed foam is generally not well suited for the dispensation of repeated small foam shots such as used, for example, in making foam-insulated food and beverage containers. Another disadvantage is that because of its relatively high viscosity, the frothed mixture has limited flow characteristics. As such it cannot be satisfactorily used in molding intricate foam articles such as wood-simulated picture frames, table lamp bases, plaques and the like. Thus a need exists in this art for a method which enables generating non-froth polyurethane foam by means of a portable foaming apparatus. [emphasis added]

And, Raynor explains that practice of the disclosed invention avoids frothing at Column 5, lines 50-59:

> By utilizing a nucleating agent according to the invention, thorough blending of the foam forming ingredients is achieved, by means of a static mixer, to the degree necessary for producing a fully reacted polyurethane foam product which is substantially uniform and free of weak spots. This result obtains in the substantial absence of any frothing. That it is to say, the blended foaming mixture, upon expulsion from the static mixer, exhibits no substantial pre-expansion and has a very fluid consistency. [emphasis added]

Thus, there can be no question that Raynor '052 teaches the avoidance of frothing rather than achieving frothing. And, therefore, there is no possible way in which one could conclude that Raynor '052 renders obvious (alone or in combination with Volkert '195) the invention of claim 34, which requires frothing as defined by an instantaneous volume increase of at least 1.25.

The Examiner further rejected claims 34-38 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,264,464 to Wishneski et al. in view of U.S. Patent No. 5,278,195 to Volkert et al. According to the Examiner, Wishneski discloses preparations of isocyanate-based rigid foams prepared by contacting streams of isocyanate component and

polyol component wherein the contacting takes place in the presence of blowing agent in nitrogen gas to enhance the foaming action. The Examiner relies on column 7, lines 28-41 to maintain that Wishneski discloses the particular desirability to dissolve nitrogen in the contents of the mixture for the purposes of providing acceptable foams for their invention. Wishneski does not however disclose specific nitrogen concentrations and particularly does not teach providing nitrogen concentrations that would reach a Bunsen coefficient of 1.25 or higher. The Examiner asserts that it would have been obvious to one of ordinary skill in the art to have employed the varied contents of nitrogen gas of Wishneski for the purposes of providing an acceptable foam forming effect.

The very same arguments provided above are applicable to the rejection over Wishneski' 464, which teaches, at column 7, lines 28-41:

> In utilizing the concept of the invention for effecting the nucleation of the foam forming ingredients, it is critical that the nucleating gas, or at least a portion thereof, be blended, dissolved, or absorbed into the foam forming mixture. This critical requirement is to be distinguished from conventional prior art techniques wherein a gas, for example nitrogen, is used only as a propellant; and, as such, it is not blended with the foamable mixture and therefore exerts no substantial nucleating effect. This prior art technique, as noted above, necessitates the use of an auxiliary foaming agent to achieve adequate mixing **which in turn results in the generation of frothed foam, a result that this invention avoids.** [emphasis added]

There is no explanation as to how a reference that teaches the addition of nitrogen as a nucleating agent while seeking to avoid frothing can be employed to reject a claim (i.e. Claim 34) that requires frothing.

Those skilled in the art appreciate that the apparent difference between the teaching of either Raynor '052 or Wishneski '464 and the claimed invention is the amount of nitrogen added to the process. Raynor and Wishneski employ an amount sufficient to act as a nucleating agent but that will not cause frothing. The claimed invention, on the other hand, employs an amount sufficient to cause frothing to an extent that a volume increase of 1.25 is achieved. Moreover, those skilled in the art appreciate that the simple of addition of nitrogen to a polyurethane foam forming mixture will NOT cause frothing. Indeed, Raynor

'052 provides this teaching at column 5, lines 12-30:

> In utilizing the concept of the invention for effecting the nucleation of the foam forming ingredients, it is critical that the nucleating gas, or at least a portion thereof, be blended, dissolved, or adsorbed into the foam forming mixture. This critical requirement is to be distinguished from conventional prior art techniques wherein a gas, for example nitrogen, is used only as a propellant; and, as such, it is not blended with the foamable mixture and therefore exerts no substantial nucleating effect. This prior art technique, as noted above, necessitates the use of an auxiliary foaming agent to achieve adequate mixing which in turn results in the generation of frothed foam, a result that this invention avoids.

In other words, and as the Applicants have explained at Page 9-10, nitrogen is absorbed by the polyurethane reactant streams. Only after a threshold amount is absorbed (which will require elevated pressures) will an instantaneous rise in volume occur (i.e. frothing). Raynor '052 and Wishneski '464, without question, employ an amount of nitrogen sufficient to achieve their stated goal, which is nucleation. These references, however, teach against the addition of amounts in excess thereof since the same would cause frothing. And, there is no teaching, suggestion, or motivation in these prior art references to do anything else.

VIII. CLAIMS APPENDIX

An appendix containing a copy of the claims involved in the appeal is attached as Appendix A.

IX. EVIDENCE APPENDIX

Not applicable.

X. RELATED PROCEEDINGS APPENDIX

Not applicable.

The Commissioner is specifically authorized to charge Deposit Account No. 06-0925 in the amount of $500.00 for the payment of fees associated with this Appeal Brief. In the event that an additional fee is due or that any amount should be credited, the Commissioner is authorized to charge any additions fees or credit any overpayment to Deposit Account No. 06-0925.

Respectfully submitted,

Arthur M. Reginelli, Reg. No. 40,139
Renner, Kenner, Greive, Bobak, Taylor & Weber
Fourth Floor, First National Tower
Akron, Ohio 44308-1456
Telephone: (330) 376-1242
Attorney for Appellant

March 15, 2007

APPENDIX A

1. A method of manufacturing a polyisocyanurate foam insulation board, the method comprising:

contacting a stream of reactants that comprise an isocyanate-reactive compound with a stream of reactants that include an isocyanate compound to form a reaction product, where said step of contacting takes place in the presence of a blowing agent and nitrogen, where the blowing agent is selected form the group consisting of alkanes, (cyclo)alkanes, hydrofluorocarbons, hydrochlorofluorocarbons, fluorocarbons, fluorinated ethers, alkenes, alkynes and noble gases, where the nitrogen is dissolved in the stream of reactants comprising the isocyanate-reactive compound, or the stream of reactants including the isocyanate compound, or both, and where the amount of nitrogen dissolved is an amount at least 1.25 times the Bunsen Coefficient for nitrogen dissolved in the stream.

2-29 Cancelled

30. The method of claim 1, where the nitrogen is dissolved in the stream including the isocyanate-reactive compound, and where the amount of nitrogen dissolved is an amount at least 1.5 times the Bunsen Coefficient for nitrogen dissolved in the stream.

31. The method of claim 1, where the nitrogen is dissolved in the stream including the isocyanate-reactive compound, and where the amount of nitrogen dissolved is an amount at least 2.0 times the Bunsen Coefficient for nitrogen dissolved in the stream.

32. The method of claim 1, where the blowing agent includes n-pentane, isopentane, cyclopentane, and mixtures thereof.

33. The method of claim 32, where the blowing agent is devoid of hydrofluorocarbons and hydrochlorofluorocarbons.

34. A method for increasing the dimensional stability of polyisocyanurate foams, the method comprising:

providing an A-side stream of reactants that include an isocyanate;

providing a B-side stream of reactants that include a isocyanate reactive component and a blowing agent selected from the group consisting of alkanes, (cyclo)alkanes, hydrofluorocarbons, hydrochlorofluorocarbons, fluorocarbons, fluorinated ethers, alkenes, alkynes and noble gases;

adding nitrogen to the A-side or B-side stream of reactants, where the amount of nitrogen added to the A-side or B-side stream of reactants is an amount sufficient to increase the volume of developing foam as it instantaneously leaves the mix head by at least 1.25.

35. The method of claim 34, where the nitrogen is added to the B-side stream of reactants, and where the amount of nitrogen added to the B-side stream of reactants is an amount sufficient to increase the volume of the developing foam as it instantaneously leaves the mix head by at least 1.5.

36. The method of claim 35, where the nitrogen is added to the B-side stream of reactants, and where the amount of nitrogen added to the B-side stream of reactants is an amount sufficient to increase the volume of the developing foam as it instantaneously leaves the mix head by at least 1.75.

37. The method of claim 34, where the blowing agent includes n-pentane, isopentane cyclopentane, and mixtures thereof.

38. The method of claim 37, where the blowing agent is devoid of hydrofluorocarbons and hydrochlorofluorocarbons.

39. A method for increasing the dimensional stability of polyisocyanurate foams, the method comprising:

providing an A-side stream of reactants that include an isocyanate;

providing a B-side stream of reactants that include a isocyanate reactive component and a blowing agent selected from the group consisting of alkanes, (cyclo)alkanes, hydrofluorocarbons, hydrochlorofluorocarbons, fluorocarbons, fluorinated ethers, alkenes, alkynes and noble gases;

adding nitrogen to the A-side or B-side stream of reactants, where the amount of nitrogen added to the B-side stream of reactants is an amount sufficient to increase the amount of dissolved nitrogen within the B-side stream to at least 1.25 times the Bunsen Coefficient.

40. The method of claim 39, where the nitrogen is added to the B-side stream of reactants, and where the amount of nitrogen added to the B-side stream of reactants is an amount sufficient to increase the amount of dissolved nitrogen within the B-side stream to at least 1.5 times the Bunsen Coefficient.

41. (Cancelled)